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ABSTRACT

During the Western Australian School Effectiveness Study (WASES), 28 rural and urban high schools and 3,500 students were surveyed to investigate features of effective schools, and 21 schools and 1,024 students were studied longitudinally. Effective schools were identified in terms of higher than expected science and mathematics achievement, when socioeconomic status (SES) and other student factors were controlled. This paper presents case studies of four WASES schools: an effective, middle-SES urban school; an effective, low-SES rural school; and two ineffective, low-SES rural schools. Data collection included interviews of principals and science teachers and observations of science classrooms. Ineffective schools displayed high levels of stress combined with low teacher morale and internal conflicts among both students and staff. At-risk students, often Aboriginal students and those suffering from health-related problems, were less likely to learn as teachers spent much time on student behavior problems. Other characteristics of ineffective schools were student violence, teacher discontent, high level of teacher transfers out of the school, and teacher fear of students. Students from lower socioeconomic backgrounds or disadvantaged family structures tended to have poor educational attitudes. Effective schools had strong leadership, good teacher-administrator relationships, clear and consistent rules and discipline, teacher collaboration, high teacher expectations, and supportive parent collaborations. (Contains 34 references and photographs.) (SV)

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The Usefulness of Value-Added Research In Identifying Effective Schools

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Abstract

During the Western Australian School Effectiveness Study (WASES), 28 rural and urban high schools and 3500 students were surveyed in order to investigate features of effective schools. Of these, 21 schools and 1024 students were studied longitudinally. Effective schools were identified in terms of higher than expected levels of achievement, when socioeconomic status and student intake factors are controlled for such as prior learning. Following this quantitative phase, four rural and urban schools were selected for closer scrutiny using a constant comparative methodology. These schools were studied intensively this year (1999) and features which make them effective or ineffective were documented. This paper focuses on these four schools, their science classrooms and how effective science teachers work in effective schools.

The Usefulness of Value-Added Research In Identifying Effective Schools

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Introduction

The purpose of this study was to identify the characteristics of effective high schools in rural Western Australia by investigating factors influencing science and mathematics achievement. Previous reports from two years of a longitudinal study undertaken in a cohort of urban and rural schools in Western Australia, called the *Western Australian School Effectiveness Study (WASES)*, are found in (Young, 1999, in press). A multilevel analytical model was used to demonstrate that most variability in student achievement is at the classroom and student level, with negligible amounts at the school level. Upon further analysis of the residuals, four schools were selected for case study analysis.

Brief Overview of School Effectiveness Research

In early research on school effectiveness, there was considerable emphasis on the ability and family background of the student in determining academic performance. The Coleman Report (Coleman et al., 1966, p. 296) estimated that the school influence on student achievement was about 10 to 20 percent of the total variance, yet the methodology used by Coleman had not accounted for the hierarchical nature of students nested within schools. Coleman's findings were repeated in further large-scale studies (Jencks et al., 1972, 1979; Hauser, Sewell & Alwin, 1976), which suggested that (1) school level variables, such as physical resources, account for small amounts of variability in student achievement and (2) student characteristics, such as socioeconomic status and home background, should be used to adjust student achievement in statistical analysis of large-scale studies.

In Britain, research into schools became prominent during the 1980s with Fogelman's findings that the amount of schooling received by students was directly related to their academic achievement (1978, 1983). While early British researchers analysed the effects of academic and social backgrounds of students, there was some doubt about whether control for differences in student intake was adequate (Reynolds, 1976; Reynolds & Sullivan, 1979; Rutter et al., 1979). Reynolds reported large school level differences in attendance rates, even when students came from similar social and economic backgrounds. More recent studies, which included student information prior to school entry and better analytic techniques, reported substantial variations between schools (Mortimore et al., 1988; Smith & Tomlinson, 1989; Nuttall et al., 1989). The improvement of analytical techniques more adequately addressed the hierarchical nature of the data, that is, the variability between schools and within schools was separated (Bryk & Raudenbush, 1986; Goldstein, 1984, 1987).

While early British research by Reynolds (1982) and Rutter et al. (1979) indicated that schools affected students equally, later studies by Aitkin and Longford (1986) found significant differences in school effects for students from different socioeconomic backgrounds. Further, Cuttance (1992, pp. 78-79) reported that achievement was significantly greater for students from more affluent home backgrounds, when compared with students from poorer homes. In this British study, Cuttance showed that school intake differences account for a large proportion of the variation in unadjusted variation in student achievement. Finally, Cuttance asserted that any analyses of the effectiveness of schools need to adjust for the social background and prior attainment of students.

Brief Overview of Rural Educational Research

Recent educational research has examined rural/urban differences in achievement, appropriateness of rural/urban achievement measures, effects of parents and the community on the attainment of rural students, and how well rural students succeed in higher education. To accurately assess the small, rural school's impact on students, rural/urban comparisons must be made on students who are matched by origin, background, and access to information. Findings that there are little differences in the academic achievement of rural and urban students or in their desire to attend higher education and that rural students

aspire to higher education contrast with evidence that rural high school students have less total access to educational information. *It could be argued that rural high school students are therefore, in terms of their overall progress, achieving more, not less, in spite of greater obstacles* (Edington & Koehler, 1987).

Many educators, researchers, legislators, and the general public believe that students from smaller and rural schools receive an education that is inferior to that of students from larger urban or suburban schools. Until recently, there has been little empirical evidence to challenge that view. Now, however, a growing body of work has begun to examine how well students perform in and after graduation from rural schools. Some of these studies are presented below, and, although the results are far from conclusive, they do suggest that some generally held beliefs about rural student achievement are open to question.

A comparison of the performance on standardised achievement tests of students from small, usually rural, schools with those form larger, often urban, institutions has not produced definitive results. Several studies have not found any significant differences between the two groups.

In research completed in the state of New York, Monk and Haller (1986) found those students from smaller (often rural) schools achieved as well as students from larger schools. Kleinfeld and others (1985), in their Alaska study, did not find that high school size determined the quality of a student's education, experience, or achievement on standardised tests. Moreover, in one New Mexico study, which looked at factors affecting performance of selected high school students, those attending schools in rural areas performed as well as those in urban locales (Ward & Murray, 1985).

Kleinfeld and colleagues (1985) suggest that schools that achieve the best results do exhibit a strong teacher/administration/ community partnership and school/community agreement on educational programs. They also have reported that there is a direct relationship between quality education programs and the ability of the staff to work toward an educational partnership with the community. Smaller communities tend to generate more community support for the school, with the school becoming a centre for community activity. This, in turn, theoretically provides the students with a greater feeling of belonging to something in which they can participate, and thus enables them to develop a better self-concept.

Finally, Stringfield and Teddlie (1991, 1993) have conducted rural education research in Louisiana for ten years and produced some fine and valuable findings. These researchers have found significant variations in what makes a school effective in the rural parts of the USA. We hope to replicate some of this work in Australia, along with a more substantive piece of research in following a number of rural and urban schools for a three year period.

Summary

Differences in effectiveness of schools depending upon the urbanicity context of the school has been investigated using a combined quantitative/qualitative strategy. Stringfield and Teddlie summarised 16 characteristics of differentiation between urban, suburban and rural elementary schools (1993, pp. 158-162). For example, 'in small towns, an effective rural principal can help the school to become the focal point of the community and garner additional resources along the way'.

This study ties together current research by Stringfield and Teddlie in the USA, Reynolds and Goldstein in the UK and Schereens and Creemers in the Netherlands to produce a unique longitudinal research study in Australian high schools.

Research Design

This research study, the *Western Australian School Effectiveness Study* [WASES] involved three phases (Table 1). In the *First Phase*, the survey instruments were developed and piloted in two schools in 1995 (Young, 1996; Young & Fisher, 1996a, 1996b, 1996c).

In the *Second Phase*, a three-year longitudinal survey was commenced in West Australian high schools in 1996. Government, Catholic and Independent secondary schools were surveyed. The purpose of this survey was to evaluate the school and classroom climate and characteristics of effective schools in differential contexts. Because the growth model is particularly useful for measuring change over time in student outcomes, while controlling for other influencing variables which may also change over time, the same students at the same schools were surveyed over a period of three years (1996 to 1998). The common longitudinal cohort was a smaller sample of 1024 students in 21 high schools. The reduction in

size was due to many factors such as loss of students due to mobility, lack of teacher cooperation, insufficient data supplied in both years and lack of tracking forms by the school. Results from the WASES 1996 data collection have previously been reported in Young (1997a, 1997b, 1997c, 1998a, 1998b).

In the Second Phase study, student outcomes in science and mathematics in 1997 were adjusted for student background, gender, academic self-concept, grade and prior attainment (1996).

Finally, in the *Third Phase*, a case study approach was used to examine some exceptional schools in the rural and urban locations of Western Australia (1999). Case studies commenced in 1998 and selected from some outlier schools based on statistical data from WASES-II. The case study research involved an intensive study in 1999 supported by funding from the Australian Research Council.

Table 1. Longitudinal sampling frame.

Phases of Study	Year of Study	Grade of Sample	Longitudinal Cohort of Schools	Longitudinal Cohort of Students
[WASES-I]	1995	Year 9	2 Secondary Schools	60
[WASES-II]	1996	Years 8, 9, 10	28 Secondary Schools	1247
	1997	Years 9, 10, 11	21 Secondary Schools	1024
	1998	Years 10, 11	21 Secondary Schools	1024
[WASES-III]	1999	Case Studies of Outliers	4 Rural and Urban Schools/Classrooms - Effective and Ineffective	

Third Phase: Aims, significance and expected outcomes

This research study has been funded in part by an Australian Research Fellowship 1995–2000 and in part by two ARC Large Grants (for the applicant) 1996-1999. The following is a yearly breakdown of the Australian Research Fellowship:

The aims of the Third Phase [WASES-III] were:

1. To collect Qualitative Data from Effective and Ineffective Rural and Urban Schools identified in this study. Four schools were selected on the basis of Socioeconomic Status (Middle and Low), Effectiveness (High and Low) and Rurality (Rural and Urban).
2. To identify the features of Effective Rural Schools and classrooms, and successful students using a combination of both qualitative and quantitative data analysis. Student achievement will be adjusted for prior learning and socioeconomic status.
3. To compare Effective Rural and Urban Schools and to document those features which are similar and those which are different
4. To compare Effective Low Socioeconomic and Middle Socioeconomic Schools in order to document similar and different features
5. To compare Effective and Ineffective Schools in order to document similar and different features

Sampling: Phase 3: Case Study of Exceptional Rural and Urban Schools 1999

The importance of the quantitative phases in this study (1995-98) was to clarify those features of rural schools which were found to be particularly effective in terms of quality and appropriateness, as well as to select schools for further investigation using a case study approach. Phase three of this study involved the case study of four high schools over a year (1999), in order to document more completely how they operate, their management structure, the climate and the kinds of teaching and other classroom characteristics which make them special or different.

Rural Schools and Urban Schools were selected from the 21 schools in Phase two of this study and visited regularly in order to document the operations, management and learning environment of these schools. Four schools were selected with the following characteristics:

1. Rural, large town, effective and low socioeconomic characteristics
2. Rural, small town, ineffective and very low socioeconomic characteristics
3. Semi-rural town, ineffective and low socioeconomic characteristics
4. Metropolitan town, effective and middle socioeconomic characteristics

There were significant difficulties in accessing schools under stress.

- many schools in Western Australia are undergoing restructuring (high schools with years 8–12 are taking in more students from surrounding schools as they become middle schools – years 8–10) and
- all high schools in Western Australia are being expected to restructure their curriculum this year into a more open, flexible format.

Under these pressures, many schools were reluctant to continue their involvement in this study. It is therefore a tribute to the four schools who participated in case study research, that they were willing to allow a researcher into their school, invade their work space and place themselves under scrutiny.

Definition: Effective schools

Many governments and policy makers (and parents) like to have a concrete number by which they may deem their school to be effective or ineffective, usually on the basis of some kind of test score. Yet those who work in schools and educational research know that the definition of an effective school is a complex concept. So too, in this study, I found contradictions.

Many educational researchers, working in the field of multilevel modelling, have developed a technique (long known in the field of regression analysis) called residuals. In simple language, science achievement is modelled using the explanatory variables known to impact on achievement such as previous achievement, socioeconomic status, gender etc… and using the multilevel model, so that group effects are purged from the analyses. The final figure is called the residual effect, that is, the science achievement residual which is left once explanatory variables and previous achievement are accounted for. In some school effectiveness circles, the residual effect is called "value added". That is, to what extent does the school "add value" to the students. Schools were then ranked by their school level science achievement residual (Table 2). This technique enabled me to identify schools with particularly low and high science achievement residuals. Residual science achievement scores tended to be higher when school science achievement was high overall.

Methodology: Sample Selection

Four high schools ranging in science achievement residual scores and staff morale, four of which were rural or semi-rural, were selected for more intensive case study research. I was unsure of what to make of a school that had high staff morale, yet low "added value" in terms of science achievement (science achievement residual). It was the purpose of this study to observe, interview and research each of these four schools, in order to identify features of effective rural schools which may have been overlooked previously or not adequately investigated.

Methodology: Case Study Research

Each school was visited, with a random sample of six science teachers and at least one of their science classes selected for observations. These science teachers were interviewed at length about the collaborative nature of their science department, the characteristics of a good science teacher, their own stress levels, the discipline and pastoral care in this school/department and other aspects of the science department and the school as a whole. Some teachers were reluctant to participate due to issues of stress, work overload and poor morale. Other teachers were keen participants or even anxious to unload some issues which had bothered them onto an outsider.

Each school was visited twice in one year (1999), with at least four days spent each visit. For the urban schools, there were two trips consisting of four to five school days each. For the rural schools, two trips were made by driving/flying out to the school and staying four to five nights in the town.

Table 2. WASES High Schools (21) sorted by Science Achievement Residuals.

School	SES (H-index)	Staff Morale	Science Achievement Residual	Staff Morale (High, Med, Low)	Science Ach Residual (H,M,L)
School 1	99.05	4.13	2.00	H	H
Fullerton Cove	98.18	3.30	1.77	M	H
School 3	Independent	5.00	1.67	H	H
School 4	93.95	3.60	1.67	M	H
School 5	92.75	3.73	1.58	H	M
School 6	89.89	3.70	1.53	H	M
School 7	100.78	3.33	1.46	M	M
School 8	95.72	3.12	1.41	M	M
School 9	97.27	3.32	1.35	M	M
School 10	93.21	3.40	1.19	M	M
School 11	Independent	3.00	1.02	M	M
School 12	100.13	3.27	.93	M	L
School 13	95.52	3.68	.91	H	L
Flinders	105.73	3.60	.84	M	L
School 15	97.00	3.63	.84	M	L
School 16	94.26	2.60	.81	L	L
School 17	94.65	4.47	.67	H	L
Dundurrabin	92.47	3.85	.29	H	L
Karrijung	88.08	3.07	.27	L	L
School 20	102.07	3.64	.19	M	L
School 21	Independent	3.30	-.04	M	L

Note: The four case study schools selected for further research are highlighted in bold.
SES index was not available for the Independent schools.

Interview Questions

While all care was taken to ask the same questions in each of the four schools, the respondents varied in their attitudes and reactions to the research study. Some stuck to answering the questions, while others launched into long discussions about their own conflicts and feelings. It was quickly apparent that those people being interviewed were keen to talk about their school (and their sense of place in the school) and the people who lived, worked and studied there each day. All interviews were tape recorded, except for a few at one school (urban) who felt reluctant about the kinds of retribution they may face later if the tapes got into the wrong hands. For the most part, tape recordings were accepted as a natural way for research to take place. For the sake of convenience, the tapes were transcribed professionally.

1. Principal, Deputy Principal(s)

The Principal and all Deputy Principals were interviewed using a similar set of interview questions. They were asked about their experiences both at this school and other schools, their beliefs about the school and the kinds of students attending, the leadership team and style, the strengths and weaknesses of the school and its personnel, the best features of the teachers and the students at risk.

Particular attention was paid to teachers who were in distress, along with whole of school stress. The researcher attended to factors impacting on Teacher Morale and Teacher Distress as useful indicators of a healthy or unhealthy school.

Other issues which were discussed included anonymity of the research data, bullying, pastoral care and MSB policy (management of student behaviour).

Finally, the Principal and Deputy Principal's were asked whether they thought that their school was effective and to what extent the teachers in this school were effective. Interviews lasted at least 45 minutes and sometimes went for an hour and a half.

2. Head of Department, Science, and Science Teacher(s)

In a similar manner, the Head of Department (Science), was interviewed. Further investigations were made regarding the effectiveness of this school. He/she was queried about the quality of the leadership, strengths/weaknesses of this school, the collaborative nature of the science department, parent involvement, shared vision/goals, features of effective science teachers etc...

It was important to document how many science teachers in the department were ineffective (incompetent or not working to full capacity as an effective teacher) —> the Head of Department was asked how many science teachers there were and how many of these were effective.

A few other questions put to the HOD and the Science Teachers included:

1. What are the characteristics of a good science teacher?
2. What are the strengths or features of the school?
3. To what extent do the science teachers collaborate with one another?
4. Is the discipline policy consistent, clear, well articulated and implemented?
5. Do you feel stressed?
6. What is the academic press like at this school?
7. Do you have a regular departmental staff meeting?

Qualitative, Ethnographic Data Collection: A Comparative Approach

A great deal of information was collected using note-taking and photographs. Teachers were consulted in staff rooms and classrooms, classes were observed for extended periods and children were observed and talked about their school. It was quickly apparent when the school was stressed.

With the advantage of visiting four schools repeatedly, good and bad schools were clearly distinguished. The key measure was stress. It did not matter whether the school was goal driven or struggling with students from low socioeconomic backgrounds. A school, which was stressed, was easy to identify and document. There was an unusually relaxed manner with my presence in all schools. They were for the most part unconcerned about the research project and quickly built a trust and confidence in my presence. Some teachers and staff were very open and others were a little nervous and unhelpful. In general, the more effective and peaceful schools had staff with good morale, effective education and a strong sense of calm. Students were usually happy to come to school.

Stressed schools had poor teacher morale, reduced learning and often displayed conflict between teachers and administrative staff (Principal, HOD, Deputy Principals). The more stress which was noted in a school, the more conflict which was expressed by the teachers towards their senior staff. Sometimes conflict and stress was limited to a group of teachers and a deputy principal, while in another school, stress was clearly visible in terms of

1. student violence
2. teachers voicing their unhappiness and discontent
3. high levels of teacher transfers out of the school
4. teachers fearful to demand good student behaviour because of the probable retribution
5. students regularly planning fights
6. deputy principals spending inordinate time managing student behaviour problems
7. lack of student learning or effective education

The progress of a school into educational ineffectiveness was slowly unravelled as each person told their story and the severity of problems became more readily understood.

In the following sections are descriptions of the four schools, with their problems and excellence. I hope that their stories are written empathically, as well as passionately and clearly. The aim here is to compare and contrast each school and how they work well or not so well. Names of schools have been changed in order to protect the kind teachers who allowed me into their classrooms and lives, as well as the leadership teams who were so willing to assist this research project.

Dundurrabin Senior High School

Dundurrabin Senior High School was selected initially as an ineffective, semi-rural school with middle socioeconomic status. There are 850 students at this school in Years 8 to 12. The buildings were new (10 years old), light coloured and spacious. The type of student attending Dundurrabin was usually non-academic and more suited to vocational education. This school is approximately an hour's drive from Perth and surrounded by government owned housing (rented) or poorer categories of owned housing. Parents were either welfare recipients (government pensions for unemployed and single-parent families) or receiving low wages.

Principal

The Principal at Dundurrabin Senior High School was a quiet, peaceful sort of leader with a tendency to create order in his office. There were few documents lying on his desk, although a computer was present. He preferred to delegate most administrative tasks and spent time each day walking about the school. While this Principal continued to carry a sense of calm across his leadership style and focused on acting as a kind of peacemaker when conflict arose, there was no sense that these attributes emanated from his office. Rather, the peaceful school environment seemed to emanate from a variety of factors – it was clear however that this Principal did not raise his voice and that conflict was dealt with in a thoroughly professional manner.

Academic Performance

Academic performance at this school is limited mostly by a peer effect. Social behaviour is strong and prevents students from appearing to be academically focused. Students at this school:

1. Don't study
2. Don't do homework (appears related to parent's occupation)
3. Don't catch up (when sick or truant)
4. Don't have organized files for their work
5. Have no sense of continuity as they have no files for their work
6. Can only work on materials provided during one class
7. Parents appear non-supportive (buy nice clothes but no school paper)
8. Students lose handouts provided to them in previous classes
9. Parents never come to the school
10. Teachers continually give out or provide pens and paper
11. Have little academic future (TAFE or University)

The tendency for low achievers not to do their homework appears to be directly related to socioeconomic background. The lower achievers tend to come from poorer families (often who work and receive no government benefits) and tend to have part-time jobs. These factors combine to create a culture of students not doing their homework.

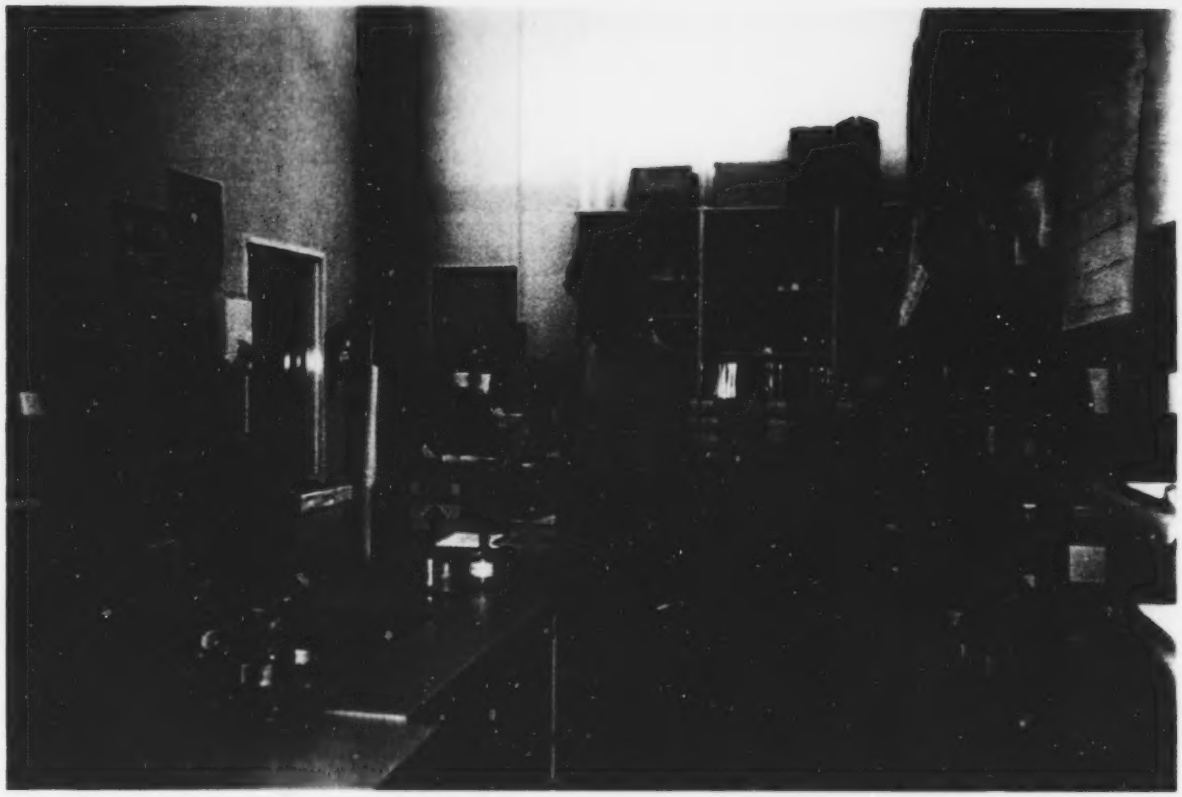

Photo 1. Science laboratory preparation area.

Laboratory Preparation Area

The laboratory preparation area was exceptionally clean, tidy and well organized. Extremely spacious, there was a sense of order and happy working. All materials were stowed away with a high level of order and well labelled. The lab assistants were enthusiastic and enjoyed their work and work area (radio played all day). Science teachers used the Internet regularly and most had their own personal e-mail accounts (as did the lab assistants).

Nesting and science classrooms

Nesting of science teachers was encouraged at this school. There was a sense of ownership. Each classroom was different, with animals or displays reflecting each teacher's personal and scientific interests. There were five science classrooms and six science teachers. The only teacher without his own classroom was the Head of Department (his own choice).

There were few, if any, graffiti problems in the science classrooms. The students sat at simple tables with laboratory equipment and gas supplies placed around the perimeter of the room. The labs were spacious, with even large class sizes accommodated well. Students tended to do more work independently at Dundurrabin and know how to use equipment such as Bunsen burners safely.

Science Staffroom

Furniture in the staff rooms was ergonomic, lighting good, desks spacious and colours were peaceful pastels. The tone of the science staff room was relaxed, easy-going and full of humour.

These science teachers spent their free time in their department staff room and almost always ate lunch together. While the whole school attended morning teatime together in the main staff room, lunches were usually more private. They knew when someone was missing from the lunch routine and commented on their whereabouts. While the students had problems, and some teachers were frustrated at the lack of competitive, academic spirit, these teachers nevertheless were confident and unconcerned about my presence. Some science teachers worked late after school – the atmosphere was pleasant and lighting good.

This sense of peace and calm in the staffroom was further evident in the attitudes of the science teachers and their presence after school. Teachers at this school did not tend to rush away after school (this was a common practice in schools under stress). While it is reasonable for teachers to rush off at the end of the day to their after school commitments, there was a core of teachers who would remain at the school at Dundurrabin. In schools that were stressed, there were almost no teachers remaining after school.

Head of Department, Science

The HOD displayed excellent leadership skills in supporting his staff, encouraging those teachers with outstanding scientific or teaching abilities and assisting with students who were difficult. There were no teachers at this school who were incompetent or struggling, but even the weakest teachers appeared to be comfortable and supported. Struggling teachers at other schools were not always so fortunate.

Photo 2. Science teachers eating lunch together sharing ideas and problems.

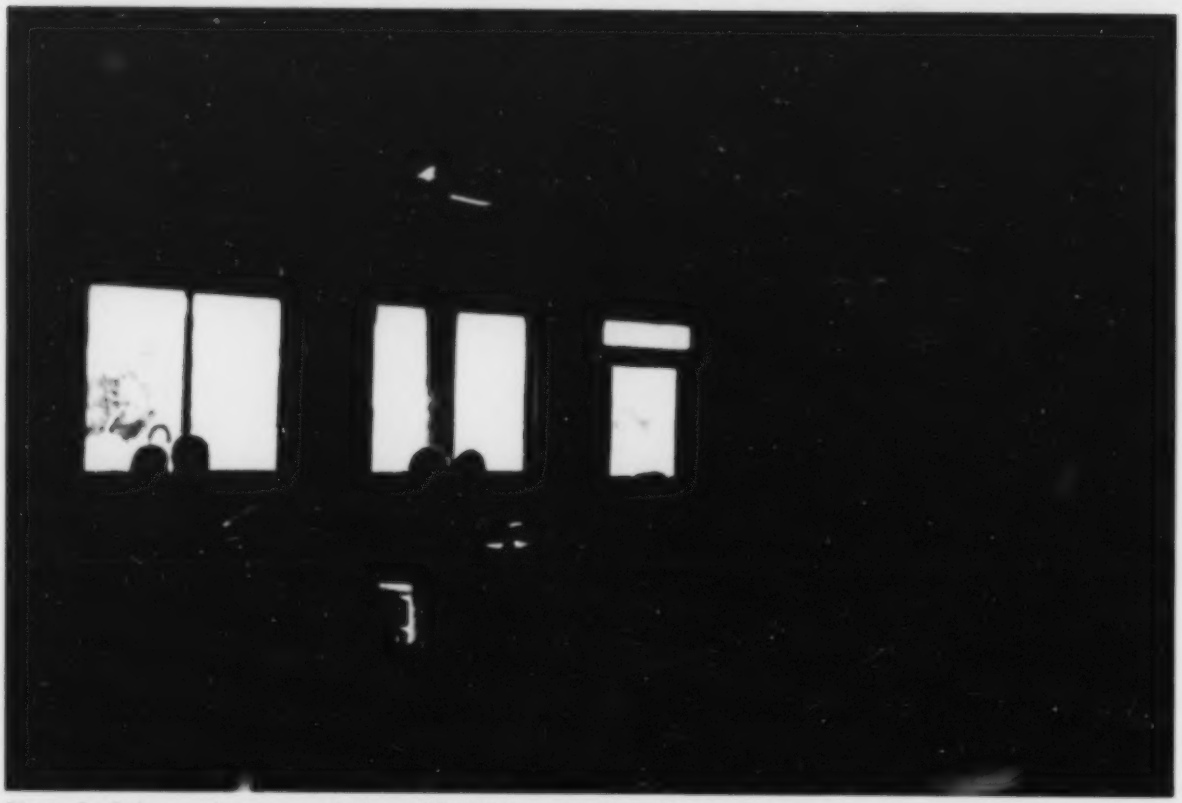

Photo 3. Science classrooms had good lighting and subdued colour schemes.

Photo 4. Science classrooms were owned by a single science teacher and were decorated with lots of projects and scientific materials.

Photo 5. Year 8 Science students on a Friday afternoon visit to the school agricultural centre to look at their tomato plants.

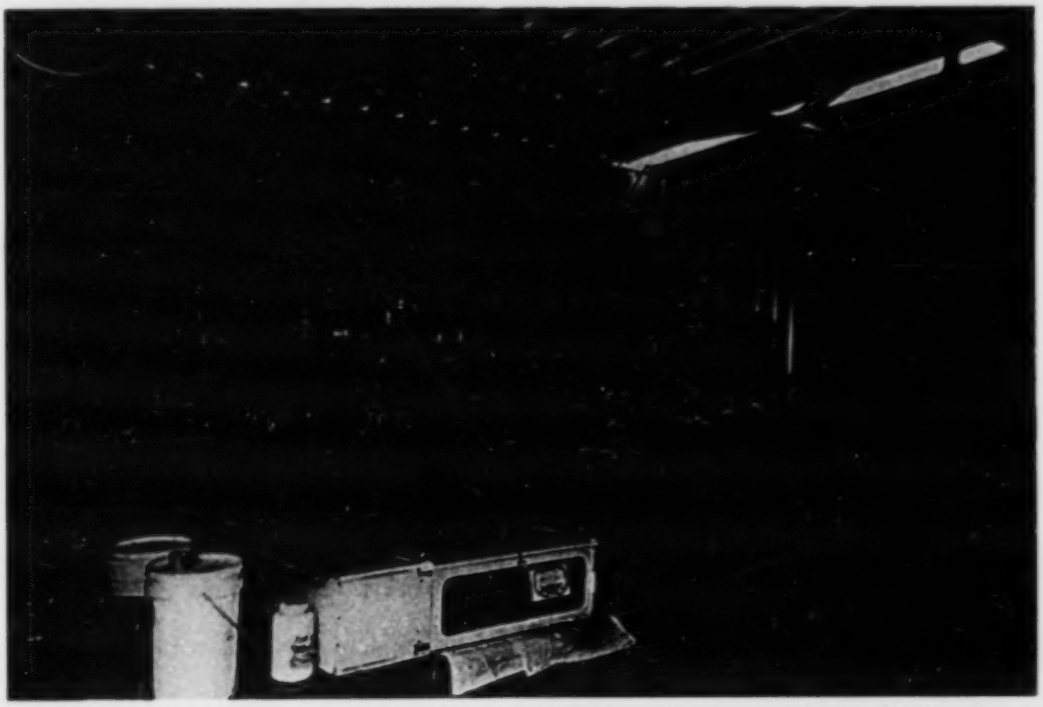

Photo 6. Small animal house: Senior science students learn how to care for small animals, take their measurements and make scientific recordings.

Photo 7. Year 8 science students take measurements from their tomato plants and check them over for disease or other signs of problems.

An agricultural technician is attending this class, along with the science teacher, in order to assist with practical needs. The green house has been vandalised, but is kept in good repair none-the-less. Funds from the school budget and the Agriculture Department assist with care and maintenance. Year eight science students feed fish which live in large fibreglass tanks. The fish are about 18 cm long marron (7 inches) and have taken 12 months to get to this size. The science teacher loves marine biology and has built the tanks himself.

Photo 8. Students assist feeding marine fish in the large fish tanks.

Flinders Senior High School

Flinders Senior High School was selected initially as an effective, urban school with middle to high socioeconomic status. The buildings were surrounded by beautiful landscaped gardens, with lots of trees. The buildings tended to be a little dark in lighting and in colour.

Principal: Doreen

Doreen feels that Flinders is an effective school in that it is constantly improving over time. However, Doreen herself does not feel effective because she is finding the administration overwhelming. The degree of accountability is increasing and this puts additional pressure on Principals to complete documentation.

> I am responding to masses amount of information of paper etc. and really am excluded by this from the opportunity to think and to plan and to truly do the job I think I should be doing as principal, and that is being the educational leader of this school, and I regret that, in my current circumstances. I mean, I work 6 days a week, I come in on weekends, just to attempt to deal with what you can see on my desk.

When asked about the ineffective teachers at this school, Doreen said

> I don't think people are so stupid as to know they are not an effective teacher, and they deal with it in different ways. Some deal with it by transferring from school to school as quickly as they can. Some have inordinate times off sick and stressed and things like that. It concerns me how they cope with being day by day in the classroom, how do you deal with it, do you just switch off?

Discipline

Keith, one of the Deputy Principals, believes that new teachers are not well inducted into the school and that there is some confusion about pastoral care and discipline. He firmly believes that these two issues should be kept together, and that induction programs should include "Good Classroom Practice". Unfortunately, Keith appeared to put the problem of classroom management into the lap of the teachers saying that good teachers are:

1. Establish self-contained classroom management strategies (don't bother the deputy principals)

2. Establish classroom rules (set by the teacher, rather than the school)

3. Establish positive classroom environment

There was a distinct sense of "us" against "them" as the deputy shifted blame and responsibility to the teacher. This was repeated in other schools where conflict existed between teachers and the leadership team set the scene for warfare, rather than teamwork.

This pattern apparently developed where teachers would constantly throw students out of the classroom, rather than follow a set of guidelines for management of student behaviour. The leadership team (Principal and Deputy Principals) often responded by insisting teachers keep students in the classroom. Teachers then felt that there was no administrative support, students were not disciplined, while the admin team were frustrated with a constant stream of students causing problems. The cycle continued with little attempt to break it. Some schools insisted on teachers taking more responsibility for student behaviours, however the constant complaint of teachers was that they knew little about the consequences and outcomes after students were sent to the administration. Administration pointed out that they were not approached by teachers. Communication was sadly lacking, along with a positive, supportive work ethic.

Head of Department of Science: Richard

Flinders students are not academically orientated, but Richard liked to think that they were well-rounded students who were being prepared for society, learning to be critical thinkers and decision-makers. He looked for the positives in children and ways to use science to teach them to observe, think and make decisions. Richard supervises ten science teachers and finds most are effective at their job. There are set science programs at this school which the teachers share: curriculum is organized for each of 27 science units or topics (strand programs) for years 8 to 10. The teachers are expected to constantly use and revise these materials.

This Head of Department, Richard, had a staff meeting once a week and asked each science teacher for a program at the end of each teaching strand (unit) either typed by the teacher or by the secretary at the end of the year (four of the science teachers were computer literate). Richard was very persuasive in asking staff to provide these materials and share as a team.

Collaborative Culture

An informal peer mentoring process was occurring between an experienced teacher and a struggling teacher, however this was not being documented in a formal way. The struggling teacher was finding it difficult to manage student behaviour and there was little that could be done for him. Some strategies had been put into place which were non-intrusive such as keeping this teacher close to other teachers – experienced teachers were sometimes forced to teach in transportables (demountables or portable teaching classrooms) which had the disadvantage of being far from the laboratories and provided little scientific teaching value. Sharing resources was not a problem at this school:

> As far as our resources go, in this school there has been no problems with sharing resources. All the teachers seem to be, since I've been here, have no problems with sharing resources.

Science Staff Rooms

Furniture in the staff rooms was not ergonomic and a little cramped. Colours and lighting were dark and dingy. The tone of the staff room was rushed and teachers spent little time at their desks.

It was a significant disadvantage to have two science staff rooms and two science building blocks. Not only did teachers have to travel from one block of classrooms to another, but also the distance separated teachers professionally and personally. The teachers in each block had less opportunity to discuss their problems and share ideas.

Photo 9. Physical science staff work area. Shelves and desk space is narrow, chairs are not ergonomic, two door entry/exit makes the whole work are a traffic thoroughfare. Four teachers shared this work space.

Photo 10. Second science staff room: a little more cheerful and better chairs; the work area was still cramped with two teachers working in this corner.

The large staff room (for all teachers) was a quiet place where staff retreated, but mostly there was no quiet place to be alone. This staff room was so large, there was little comfort offered there. The library was always full of students and staff. Academic pressure was high at this school, but so were stress levels. There were few, if any places where students or teachers could be alone.

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Laboratory Preparation Area

Laboratory preparation area was cramped and difficult to keep in order. Materials were not put away and the work area far too small. The lab assistants worked in a less than optimal work environment. There was stuff shoved in all sorts of boxes and locations, labels did not match what was in the cubbies.

Photo 11. Storage area in the Science Preparation Laboratory.

Photo 12. Chemicals and glass storage.

Photo 13. Science greenhouse for students to grow their plants and observe growth data. Steel mesh all around the greenhouse was used to keep out unwanted guests. While vandalism has been a problem, this school has taken active steps to protect their classrooms and greenhouse. All classrooms are kept locked.

Science Teachers

The science teachers are mostly competent and some expressed concern that their school was growing too quickly and too big. Flinders Senior High School has grown from 1100 to 1300 just this year:

> The biggest problem I think that we have is that as a large school, it's hard to get standards the same over the whole school, and I know we are not the largest school in the State, but we have risen almost 200 kids this year, and I think **discipline is a big issue** myself and I think that if the kids know the rules, they have to be accountable to the rules and they have to be responsible for their own actions. I think that that makes a much healthier and more positive school environment.
>
> I feel that sometimes those **rules aren't clear** across the whole school and sometimes we seem powerless to do something. Certain kids stand up to the system, so that causes disharmony through the staff and heartaches and headaches for deputies. The deputies seem to be overworked at times with so many kids causing trouble.

This teacher also felt that the staff could be more communicative:

> I think overall **communication** in a big school like this, to me doesn't quite work as well as it should and so the deputies aren't getting all the communication from teachers about certain things that are happening in classrooms and then the communication is not getting back, and then certain people get upset and so on. I think that communication could be better, amongst the whole staff. It can make communication difficult sometimes when you've got a kid that maybe you think that that kid is only playing up in your class, and they might be right across the school.

Within the science department, the staff felt that there was harmony:

> We all do certain things for each other. I think the science department works extremely well in that way. For example, when we are having problems with a certain kid in our classroom, we can go to another staff and say, look, you've got an Upper School class (Year 11 and 12) at this time, would you be able to take this kid for this period, because they are disrupting my lesson, until we have had a chance to sort this kid out and get him back to normal. So, to me, the science department works extremely well together in all aspects of **sharing work load** and so on.

While there was discontentment about school level issues, such as not having time-out room for students, the teachers were happy with the way their science department operated. There was a sense that their department was run as a tight ship, with **strong leadership**:

> My perception of Richard is that he is fairly dictatorial, in what he wants. He knows what he has to get done, one to get the science department to look good, two, to try to meet a time line, so he will bring it to the meeting and say, "I propose we do this".

Students at Flinders

Teachers at this school struggle against a wall of resistance to academic performance. This was a constant problem in lower socioeconomic schools. Teachers were continually frustrated that they could not improve achievement by setting homework or higher standards of achievement.

> I think the work ethic of the students in this school is very poor Their expectations of having to do work is pretty poor. It's almost as if 'I've got to go to school, I'll go to school and I'm going to do some learning.' It's only the very dedicated home life situation or the self-motivated students that do what you'd see to be the equivalent of a work programme which is going to guarantee them success. These kids are quite happy to go for **mediocrity**, and I see that as a problem in the school.
>
> **There is no aim for excellence generally.** That's not to say there isn't excellence and it's not to say that there aren't very good students at this school. I find it very frustrating to walk into a class and try to say: 'Look, I want you to do this for homework and I'd like you to do this over the weekend.' I find that half the kids don't do it and then you try to follow it up. Rather than doing every course as a natural thing to gain success, which I have always been used to, especially teaching the higher order subjects, I even find the same sort of work ethic coming through in physics and chemistry.
>
> **[Homework is] regularly not done**, it's just over the board it's frowned upon as if it's an imposition to their life. "Oh, I've got work to do tonight, or I'm going out tonight", it's not saying "well, I'll make time".
>
> Most of the kids work, most of the Year 10 and above would be working [at an after school job]. You'd find 90% of the **kids have got part time jobs**, 80%, and so to set homework on Thursday nights is almost inflicting pain on them because they work until 9.30pm. The other thing that I find, the work ethic, is the attitude of the students, even though we have got peer support programmes and we try to build up self-esteem and so on, it's still square to be academic. **It's still not cool to be successful, and that's an attitude that's endemic in this region.**

Nesting and Science Classrooms:

Photo 14. A Science Classroom with numbers on each desk.

Science teachers did not nest at this school. That is, they did not work in the same science classroom but shifted from room to room throughout the day. Some of these rooms were in transportable buildings. This was somewhat a result of the influx of 200 more students (years 11 and 12 from a neighbouring senior high school which was contracting to years 8 to 10) who arrived in this school 1999.

They were constantly on the lookout for vandalism and students would frequently be caught out (teachers used seating plans to catch graffiti and damage). Science teachers focused on their students and had a genuine sense of concern for them.

The desks were numbered and a seating plan used in every science class. This was to assist the science teachers in keeping track of vandalism and graffiti. Students were more easily identified and this deterred the problem. While this classroom was comfortable, the decorative materials (scientific) were not owned by the science teachers. The rooms tended to be dark and lighting helped. Unfortunately, gas outlets on each desk encouraged the students to stick things inside them and the teachers were constantly finding one outlet was jammed. This meant that all outlets had to be shut down. There was simply not enough room for students to work on the benches around the perimeter of the classrooms.

So what is Positive and Negative at Flinders? (Emphasis on Science)

One teacher summed up the issues at this school as follows:

Strengths

- Warm, open children/students
- Science department leads by example
- Strong science team
- Low ability students rotated
- Although there are two science buildings, there are no divisions
- Positive science initiatives

Weaknesses

- Lack of consistent discipline across the school
- Lack of communication between leadership team and teachers regarding student behaviour problems
- Different deputy principals deal with students differently for the same offence
- Science teachers need their own classrooms in order to "nest": a process of placing personal, scientific and teaching materials in the classroom which promotes a sense of "science" as a positive, student-friendly pursuit
- Lack of academic press among students resulting in low to no homework and mediocre academic standards

Fullerton Cove Senior High School

Fullerton Cove Senior High School is reasonably large with ~950 students attending Years 8 to 12 (Grades) and drawing from a rural community located in a large rural town in the South West of Western Australia. These students tend not to be academic (high achievers), but come from lower socioeconomic backgrounds (32% are from single parent families). Most Aboriginal students in this town attend this school because of its Aboriginal aides and programs (7% of the school). This school takes pride in being a caring school – the pastoral care support is very strong in this school.

This school distinguished itself with the absence of conflict between teachers and the leadership team. The teaching staff appear to be satisfied with the roles of themselves and the leadership.

> The Principal has the overall responsibility, the final decision making if so required. There are Heads of Department who virtually run their own departments. So the Senior Staff Meeting which includes a Principal, HODs [Heads of Department], Deputy Principals, and Program Coordinator who's working with deputies. It's the Principal who makes the overall decisions for the total school policy and the HODS within their subject areas.
>
> They really discuss general proposal policy as well as the normal day to day running, decisions are made within this. There is also a school council, which consists of elected staff and principal and members elected from the public as well as students. And they have overall decision making, although the Principal can override this. You could almost use the word rubber stamp. I don't think they've gone against him, they may have made some suggestions on some smaller items.

The Principal at this school has a strong leadership style, with a sense of pride in his school. He has a strong sense of ownership, as do many teachers who have been in this school for more than 20 years.

Students

The story of students was repeated across Dundurrabin, Flinders and Fullerton Cove. Jobs after school interfered with student's performance in examinations and their overall academic performance. There were some confident, able Year 11 students who were not performing, not motivated. While they had the ability, they simply did not want to do the academic work necessary to achieve higher performance. There were some parents who were very influential in pushing their children to do well, along with peer group influences to push one another to succeed. However, this was a rare occurrence.

Discipline

Fullerton Cove has few problems with discipline and there is a third deputy (Program Coordinator) who manages student behaviour which teachers cannot manage. There is no question in this school about behaviour and the time-out room is there for all teachers to use. The Principal described their **Student Discipline Policy:**

> Problems, like teacher has a problem with the student in the school, hopefully doesn't get in front of us [the Principal and Deputy Principals] because we try to empower the teachers to keep control of the situation for as long as they can and built into that is we have a sheet of the discipline.
>
> If it's working right the teacher will say, look, you know you're doing this or you're not doing this. Here's our work-out sheet and I'm writing down. It's got here: I'll ask you to shift in class and whatever, but you're not responding so I'm going to write down on this sheet that I'm speaking to you on this issue and on this day.
>
> One of the things they can do is they can send a lower school kid to what they call upper school withdrawal, which is like a buddy system, rather than outside. Although sometimes people send kids outside, typically they send them to a buddy, who's teaching upper school: called upper school withdrawal. If it gets to a situation where its not resolved there's what's called timeout, you know the system.
>
> **Is the timeout room supervised by teachers all day?**
>
> Yes all day, every period of the week.
>
> **Are there always kids in there?**
>
> Yes I'd say, I [the Principal] do it once a week, once a fortnight I do it [supervise the timeout room]. Most people do it once a fortnight but its manned very period of the week and there's about 12 or 14 desks in that room from memory and I'd say typically there's 5 or 6 kids in there when I'm in there. Typically 5 or 6, some days there's none and some day's there's 8 maybe.
>
> **Do all the teachers follow the same protocol for management of student behavior and is it really well understood by all the teachers?**
>
> We've built into our school planning an extra section called organisational review, so, although its not a school priority, we think that some things need to be revisited. One of them we've just been talking about is, we began with anti -bullying program as a priority in this school 4 years ago, [1995].
>
> Even though we pick up new teachers and induct them, we haven't actually revisited the whole staff and we've made some assumptions. It's now 3.5 years on and next year we're going to pick that up as a review of the process. MSB [Management of Student Behaviour] and the timeout room: all new staff are picked up early on and given induction in that.

Nesting

Almost all of the science teachers at Fullerton Cove SHS had their own science classrooms, with internet connections. Susan was a biology teacher and enjoyed having animals, aquariums and biological specimens around her room.

Photo 15. Students work in cooperative groups in Susan's science classroom.

The Wetlands Project

Fullerton Cove was built in 1966 on reclaimed coastal swampland. The wetlands appeared in the Holocene period about 6000 years ago. The water in the wetland is mostly still with many areas temporary and seasonally filled. The wetland is a swamp or sumpland. To the south of the Wetlands there is a permanent sump pond which receives runoff water from the school buildings. This overflows into the Wetlands. Much of the surrounding area to the east of the school remained as wetland. In the last 10 years it has been reclaimed for housing.

We were fortunate that a small strip 60 metres by 300 metres remained as a buffer between the school oval and residential area. This area has always been used as a living laboratory for Science students, Society and Environment students and as a source of inspiration to Art and English students.

The school community recognises the high value of our wetlands. Briefly these are –

- breeding grounds for many animals especially frogs and birds;
- habitat for flora and fauna;
- study area for education and research;
- outdoor recreation;
- nutrient recycling;
- landscape, beautifying our school grounds;
- they support wildlife which can help control insect pests to nearby properties;
- they help purify water by filtering sediments and nutrients.

In 1997 the adjoining Primary School received funding to extend their playing fields by reclaiming part of the swamp area.

December 97' Before fill	January 98' After fill

Photos 16a and 16b. The wetlands before and after the fill.

Science students began a period of negotiation with the primary school and local residents. An independent Environmental Study was conducted as a result of the students' concerns. A compromise was met and only 60 metres was filled and improvements to drainage and excavation of a pond was carried out in February, 1998. The pond area was fenced for safety reasons.

Students were made aware of the vulnerability of their Wetlands and the poor state to which they had deteriorated. Buffalo, couch, pampas grass, and castor oil plants were overtaking native species and it was becoming a dumping ground for garden refuse.

Students have taken it upon themselves to liaise with different community groups to obtain the necessary resources and advice required for the successful rehabilitation of the Wetlands.

Photos 17a and 17b. The Wetlands Project Research Centre (in Susan's science classroom) and "Frog Hollow" named for obvious reasons

Science Staff Rooms

Because these teachers are encouraged to nest, they often are found in their science classrooms, rather than at their desks.

Photo 18. Science staff work in crowded conditions, however they do have bookshelves and larger desks. The chairs are ergonomic as well.

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Karrijung Senior High School

Karrijung Senior High School is located in a remote part of northern Western Australia. This school has a large percentage of Aboriginal students

Teacher morale and science achievement were both low at Karrijung Senior High School. This school is small with 285 students and many of these are Aboriginal or of mixed racial parentage. Further, many were Croatian, Yugoslav and Vietnamese. These ethnic students had been in Australia for only two years or less and still spoke their home languages at school (to avoid detection by the teacher of inappropriate conversations). Fights were common among girls and boys and usually associated with payback: that is, Aboriginal relationship problems were brought to school and the conflict resolved by a fight. Karrijung is a school in trouble. The statistics suggested this, and was further confirmed by the first day of the visit.

First impressions of the students in their classes was that they were often not in class, but wandering and finding it difficult to sit. However, these students were in the minority. The Aboriginal students found it hard to sit still and would leave their seats and try to leave the classroom. Often a student would decide to attend a class which was not theirs – so they could be with their friends. In classes where Aboriginal students predominated and achievement was low, there was regular wandering and violence often occurred. Teachers were powerless to stop this. Rather, they endeavoured to minimise the disruption using non-aggressive strategies. On previous occasions, teachers who used aggression or physical means to block student movement in and out of the classroom had ended up escalating the situation and had been hit. While not afraid of these students, they were instructed to avoid escalation of violent situations, protect themselves and use calm and quiet tones when interacting with the students.

This school did not appear to have a MSB (management of student behaviour) policy and the students knew that there were little or no consequences for their poor behaviour.

Teacher Expectations

David is a young teacher and hangs a little loose. He is new to this school (commenced Term 4, 1998). David is positive and enthusiastic about teaching. His science classroom is bizarre: students have painted the benches with surfing designs. He takes the kids for soccer training each week, which sometimes clashes with student surfing interests, but is very popular. Students love David. He is often confronted with problems in his science classroom, yet is undeterred by obstacles and chooses to remain determined to teach science.

David takes risks, encouraging his students to practice science. For example, students used scalpels to cut up a set of lungs. This was risky behaviour, because some students were inclined to use the sharp blades inappropriately (especially when the teacher left the room). Rather that expecting the worst, David was willing to take a chance with the result that the students learned and practiced science. This was a key issue for good science teaching in this school:

When teachers expect students to learn, they provide opportunities for good science teaching and learning. Teacher expectations set the tone for the classroom.

Photo 20. David's science classroom was painted by his students. He is teaching these students how to observe lung and heart tissue under the microscope.

Wandering

Throughout the school there was an endemic problem of "wandering" students. They would simply not show up to their class, or turn up and then leave the classroom. The teachers played a helpless, hopeless role here. Mark was not tolerant of this type of behaviour and did not like the way students would wave and interact with his class. He used a strategy of placing paper over the small windows to the classroom in order to prevents students looking in (who were wandering around the school) and discourage them: "Go away, you are annoying".

Mark was regularly given tough classes. This meant that difficult students were put in one class (usually Aboriginal), with the rest of the students who were taught using normal science teaching lessons. This impacted negatively on the class with difficult kids. They were known to the teacher as a babysitting class and taught using rote learning and text writing techniques. This had the advantage of providing the science teacher with a sense of control over the students poor behaviour. These students had in the past used dangerous tactics with science equipment in causing harm to one another. However, the science learning had become minimal and the students were bored and restless. While succumbing to the reading and writing, in the way old people succumb to tranquillisers in a nursing home, education became lost. Teaching tough classes at Karrijung had previously resulted in violence to the teachers. They in turn had become disillusioned.

When teachers expect students to behave badly, they provide little opportunities for good science teaching and learning. Low teacher expectations set the tone for the classroom.

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Discussion

One of the first indicators of ineffective schools were the high stress levels combined with low teacher morale. When a school with low teacher morale was visited, the degree of internal conflict was apparent within minutes both amongst students and staff. The educational outcomes were that students at risk were less likely to learn, as teachers spent inordinate amounts of time managing student behaviour, more often truant from school and more likely to be absent from class even when attending school. These factors confounded the stressed state of the school, with the leadership team expending time and energy trying to manage student behaviour which has become out of teacher control.

Students at educational risk were more often Aboriginal or suffering from a health-related problem (eg, attention deficit disorder). Stressed schools tended to exhibit the following characteristics:

1. student violence
2. teachers voicing their unhappiness and discontent
3. high levels of teacher transfers out of the school
4. teachers fearful to demand good student behaviour because of the probable retribution
5. students regularly planning fights
6. deputy principals spending inordinate time managing student behaviour problems
7. lack of student learning or effective education

Pervasive problems were found in all schools where students were from lower socioeconomic backgrounds or from disadvantaged family structures – such as single parent families. These problems existed because of self, peer, parent and sometimes teacher expectations. Students attending schools such as these tended to generate a tribal culture featuring:

1. it's not cool to study and do well at school
2. it's unreasonable to do homework every night
3. parents tended not to be supportive of educational goals

So what did the good schools do to be educationally effective? Schools with good morale and lower stress levels amongst teaching staff had a few important characteristics:

1. strong, dependable leadership
2. teachers had confidence in and support from their administrative [leadership] team
3. rules and discipline in the school are clear and consistent across teachers and leadership team
4. communication between teaching staff and leadership team is positive and consistent
5. teachers share their workload in their department and collaborate with one another
6. teachers have a positive attitude towards going the extra mile
7. teachers have high educational expectations in spite of apathy among students
8. supportive parent collaborations
9. teachers have high student behavioural expectations in spite of difficult circumstances

Implications

This study demonstrated in a graphic way the problems faced by both effective and ineffective schools. Whether rural or urban, schools have special difficulties if teacher morale or student attitudes towards school were low. Rural schools were not alone in dealing with the problem of students with low academic expectations and motivations. All four schools had able students with consistently poor attitudes towards schooling and educational goals and outcomes. The best curriculum in the world would not help these students if they did not improve their attitudes. This problem was pervasive in schools from lower

socioeconomic backgrounds. While teachers pointed to the remote/rural locations of their school from centres where they could study higher education, these attitudes were found in a similar city school.

Teacher morale was an even more difficult and entrenched issue. Without the guidance of a strong and expert Principal, it is unlikely that morale can be improved once it has been low for a long time. Teacher morale certainly plays a significant part in making a school ineffective, however good teachers can overcome many obstacles to ensure that good learning takes place, irrespective of the beliefs and attitudes of those around him or her.

How do these factors relate to cognitive student outcomes? In this study, there was a strong relationship between schools with high science achievement growth (residuals) and teacher morale. The top six schools with strong science growth, all had high to medium teacher morale. However, this was not always the case with two schools demonstrating high teacher morale and low science achievement growth.

One such school was Dundurrabin SHS. Almost all teachers worked together in a strong, collaborative way. Further, the buildings, colour schemes, and physical environment had a positive effect on the people inhabiting this school. There was a very calm, peaceful manner in the way people talked to one another and worked together. However, there was also a sense of frustration with the children attending this school and this was probably directly related to the low achievement growth. These students had little motivation to learn even when they were very able. Many students would come to class without paper, pens, books or files. This school was an anomaly in that the students were coming to a good science lesson and a good school, without the internal desire to learn.

The implications for further school effectiveness research lie in not only the importance of the longitudinal multilevel methodology for identifying effective schools, but also in looking at these schools in a more substantive way. It is imperative that we examine affective, along with cognitive, variables in order to investigate the sorts of variables which make schools effective.

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Anonymity

The names of schools and people have been changed to protect their privacy and anonymity. Students and teachers were asked permission to use their pictures in this research. All participants were provided with a copy of this paper and kept informed.

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